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Wellcome Centre for Medical Science

THE PUBLIC IMAGE OF SCIENCE IN GERMANY

1. Attached is a paper on the public image of science in Germany.

2. This has become a big issue in the last year. It is seen as a key component in the "Standortdeutschland" debate (Germany's future as an industrial base). Public attitudes make it more difficult for industry and researchers to carry out sensitive work due to direct action, eg destroying genetically altered crops, blocking nuclear waste shipments. More importantly the same attitudes feed through the political process to governments at all levels. This has led in particular to Land governments and local councils taking a tough line on licensing experiments and new industrial facilities. Where the Green Party is in government, eg in Land Hesse, they have been able to close facilities and hinder the operation of others.

3. The German establishment has been slow to react to the causes of opposition to technology. But in particular since the advent of Research Minister Rüttgers, the government and the research community have gone on the offensive to put across to the general public the benefits of research and new technology. No ministerial speech on Germany's future is now complete without its reference to R&D. Chancellor Kohl has seized the issue with the formation of his Technology Council. Public attitudes are being monitored and there are signs that the campaign may be having an effect. But much remains to be done, as the German public's reaction to Brent Spar demonstrated. Here the scientific arguments were submerged by a flood of environmental emotion.

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4. As you will see from the paper both the UK and Germany are mounting similar campaigns to promote public understanding of science. The main difference as far as I can see is that, while we are trying to encourage the study of science, the Germans are addressing the suspicions of the public at large about where science is taking society. Nevertheless, there may be some scope for exchanging views with the Germans at official level.

British Embassy, Bonn

6th November 1995

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THE PUBLIC IMAGE OF SCIENCE IN GERMANY

SUMMARY

Germans are anxious about their industrial future but are wary of the measures needed to secure it. Historical context (paras 3 & 4).

There is much to be proud of as research is respected, well funded and generally of a high quality (5 & 6).

However, there is widespread opposition to technology (7).

Biotechnology, nuclear power generation and, to a lesser extent, multimedia face particular scepticism (8 to 11).

Administrative constraints also exist (12).

The central challenge is to convince the general public of the need for technology where the benefits are not necessarily apparent. Otherwise, German industry will lose out in the longer term (13 to 15).

The Government, along with other organisations, is acting to improve perceptions (16 to 27).

Some politicians are taking up the challenge (28 & 29).

Opinion poll evidence (30 to 34).

Conclusions: The problems are real but progress is being made. Traditional German strengths will not disappear overnight (35 to 38).

THE PUBLIC IMAGE OF SCIENCE IN GERMANY

1. Germany is in a state of angst over its industrial future. German firms are investing abroad five times more than foreign firms invest in Germany. Unemployment is rising despite economic recovery. Rapid technological change is seen by many not as a solution to the problems but as a cause. Hostility to new technology by large sectors of the general public is seen as a barrier to investment. The Germans are in a "Something Must be Done" mode.

2. This paper sets out to analyse the views of the average German towards Science and Technology and to review attempts made by the German Government, in particular the Research Ministry (BMBF), and the research community itself, to increase public support for Science.

BACKGROUND

3. Two factors in recent German history are crucial to a full understanding of the background to current attitudes. Firstly, the perceived misuse of science by the Nazi régime ensured that present-day German scientists have had their professional independence protected in law to a greater extent than most comparable countries. They have therefore been less inclined to interact with society and industry than in other countries.

4. Second, while the "Economic Miracle" of the 1950's and 60's, achieved in part through a faster rate of technological advance than its competitors, has given the Germans tangible experience of the benefits of science, this very success has led to the public questioning the need for continued scientific advance. Many believe they can now afford a greener, back to nature existence.

THE PERCEPTIONS

5. Casual observation of life in western Germany confirms that the average German likes the results of scientific progress. Germany boasts some of the most ostentatiously affluent lifestyles in the world. German company spending on R&D is beaten only by the US and Japan. The government has financed one of the most thorough and complex research communities in the world, of which the Government Research Centres, universities, Max-Planck and Fraunhofer Societies, as well as a host of more independent research bodies, bear witness. Germans are justifiably proud of their achievements in a number of spheres, from chemicals to cars to industrial machinery.

6. Like their colleagues in industry, German scientists and engineers are suitably rewarded. In Germany, their professions are highly regarded and well remunerated. Problems of filling university science courses with talented students are minor compared to those faced in the UK, and are usually seen as a consequence of cyclical downturns in the engineering labour markets rather than a general apathy to science per se.

7. The flip-side only reveals itself on closer inspection. Resistance to technological advance, ("Technologiefeindlichkeit") is widely found at the grass-roots level and is particularly strong in the large public sector. It is often manifested in fears that technology is tampering with nature, that machines are becoming more important than people, and that rapid change conducted in a moral vacuum is somehow out of control. The Green Party in particular has tapped into this discontent, and election successes have made them the third force in German politics. Despite such a vast industrial base and broad middle class, the Greens are more influential here than anywhere else in Europe. The Greens have entered government at Land and local levels and, because of the constitutional structure in Germany, have gained influence and power. This has changed the environment in which industrial production and research are carried out, in particular in Hesse, where the Greens have been in government for some six years. In a recent interview, the President of the Max-Planck Society talked of a media-orchestrated campaign of discrimination against and resistance to researchers, some of whom were emigrating as a result. While this might overstate the case, it is significant that such a senior figure in the research community should express such concerns. Thus, while research in Germany is remarkably well structured and funded, it tends to face tougher constraints than elsewhere.

8. One example of a current technology in rapid development which evokes mixed feelings is multimedia and its applications. In a recent survey, 50% of those asked feared that society would be overrun with such applications and 48% that the quality of human relationships would suffer as a result. The government faces the dilemma of whether to risk a public acceptability backlash or inhibit investment by setting over-intrusive constraints.

9. Two other areas of current public concern are nuclear power and genetic technology, where many feel that science threatens the long term future of man and his environment. Both receive weekly coverage in the national press, and public protest is common. The recent transport of one container of highly radioactive spent fuel rods from southern Germany to the interim repository in Gorleben, Lower Saxony, necessitated the biggest police operation in post-war German history costing around DM 50 million. Current protests against

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genetically-altered crops include publicity campaigns, petitions and violent demonstrations. Fields of experimental crops have been destroyed by protesters.

10. Opinion polls generally yield results of a fairly even split between those for and those against nuclear power, with possibly a slightly higher level of support in the eastern Länder. However, even those in the industry recognise that much of the support is fairly fragile and would suffer a decisive setback from a further Chernobyl-type accident. Interestingly, in a recent study by the BDB (Association of German Banks), over two thirds of those asked were in favour of making use of existing plants, but only 10% supported building new ones. In contrast there is surprisingly little opposition to nuclear research (as opposed to nuclear power generation). There is widespread acceptance of the need for research on decommissioning and operational safety for existing power stations, and for materials and medical research using research reactors. The main exception to this is the new Munich research reactor (FRM II). But opposition to this project is due to its design (it uses weapons grade HEU and thus supposedly poses a proliferation risk) rather than what it will be used for.

11. In all these areas a striking factor is the almost complete absence of middle ground: either you are totally for or against these issues. Reasoned debate is the exception rather than the rule.

12. Germany is sometimes described as a country overburdened with administrative laws, and this applies very much to innovation and patenting. Individuals have an enormous number of rights against the state, and this is reflected in the number of legal obstacles facing those wishing to innovate. A recent survey gave the average time taken to obtain a patent right as being 14 months in Britain, 9 months in France but 49 months in Germany. Furthermore, between 1975 and 1994 the number of patents in Germany as a proportion to those in the US fell from 50% to 33%, while compared to Japan, it fell from 25% to 10%. There seems little concern in the general public and not much that central government can do to rectify the situation. Similarly, planning permission procedures are cumbersome and liable to be highjacked by protest lobbyists. One example is the genetically produced insulin plant which took eight years to build and commission. Another is the threat to epidemiological research due to over-strict adherence to data-protection laws.

13. A central problem of those involved in government technology and innovation policy is how to reassure the man in the street that he has nothing to fear from technology where the benefits may not be immediately apparent. This is well illustrated by polls which put acceptance of genetic technology in health matters at 70% to 80%, but for genetically-treated food at around 20%: the one they need, the other they believe they can do without. A further example is the failure of Transrapid, the maglev railway, to gain broad acceptance among the general public.

14. There is an increasing groundswell of opinion that hostility to technology may have repercussions for the German economy in the longer term. In August, President Herzog, in a speech to leaders of the German scientific community, highlighted the problem and stressed the importance of continued scientific excellence. Newspaper columns and news programmes, as well as private discussions up and down the country, are turning increasingly to what is called the "Standort Deutschland" debate: the question of how Germany can remain an attractive location for industry and investment. Many people argue that the current resistance to change, and neglect of the means to innovate, ultimately have the effect of exporting jobs to where the the climate is more innovation-friendly and production cheaper, often to Eastern Europe. Several recent high-profile cases have fuelled the debate. Daimler- Benz has announced plans to relocate more of its operations abroad, and Siemens' decision to site its new microchip factory near Newcastle has made many in government and industry sit up and take note. The possibility of German supplier companies following suit adds to the importance to such moves. A German Chamber of Commerce (DIHT) study earlier this year estimated that 30% of all German firms were considering switching part of their production capacity to foreign locations.

15. On the other side of the debate, the techno sceptics argue that jobs created in environmental technology industries in Germany will in the end outnumber those lost abroad. They say that Germany should lead the way in shunning questionable technologies. The rest of the world would follow and Germany would remain competitive.

THE RESPONSE

Science Centres

16. Possibly the most imaginative and far-reaching project to raise the profile of science and to spark the public imagination are the plans to construct a number of Science Centres in different parts of Germany along the lines of the "Cite des Sciences et de l'Industrie" in Paris. The Federal Research Ministry aims to present the role of invention and innovation in an everyday context, with the help of videos, displays and amusements. By doing so, it hopes to stimulate debate and increase understanding about the aims of science and thus serve as a step towards overcoming this natural suspicion of new technology in the population at large, with particular emphasis on schools. Additionally, it hopes to bring scientists out of their ivory towers to listen to the views of the general public. (This is in general a further developed concept in Germany where individual research institutes have for a long time recognised their responsibility for explaining and justifying what they do to a wider audience.)

17. It is a huge undertaking and plans are still at an early stage. Finance is a major obstacle, though it is hoped that the Länder and private enterprise would pay a large proportion of the costs of ventures in their areas. A figure of between DM 100 million and DM 300 million per project million has been mooted. "Intercity NRW", a multimedia demonstration project in Nordrhein-Westfalen, is regarded as a forerunner. BMBF officials say no federal money has been budgeted for this in the next two financial years and plans have stagnated somewhat in the last few months. Substantive progress may not come until after the "Expo 2000" exhibition in Hanover, as this itself shares some of the aims of the Science Centre concept.

18. A copy of the study examining related experiences in other countries, particularly France, Japan and the USA is being sent to OST. Brief comment is made on the "Launch Pad" project in the Science Museum in London and the authors note that this now receives more visitors than the rest of the Science Museum put together.

Media

19. A long running feature is the daily radio newsletter on Deutschland Radio (the national radio network) aimed at the man in the street and telling him what is going on in science. A transcript of one such programme has been sent to OST for information. It must be noted however that most Germans listen to local radio stations which tend to take a more populist, sceptical approach to science.

Competitions for Young Scientists

20. Three projects with equivalents in Britain are "Jugend forscht" (a young inventors competition), "Tage der Forschung" (Research Days), and the related "Tage der Offenen Tür" (Open Days). The first is a competition dating back to 1965 which attracts around 4000 entrants from schools all over Germany each year with the objective of promoting creativity and the pioneer spirit. It is run by the Chancellor's Office and obtains support from a number of private companies. The President or Chancellor usually attends the prize-giving ceremony. The organisers note that the event has quickly attracted interest in the new Länder.

Research Days and Open Days

21. The Research Days are designed to expose scientific institutes to publicity and allow the general public to see for themselves what goes on in research. They are run by the Chambers of Commerce on behalf of the BMBF and concentrate on innovation promotion. The Open days, organised by the public sector research institutes themselves, have a similar aim but tend to concentrate more on basic research. The government hopes that the general public will become more

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aware of the opportunities opened up by the scientific community as well as problems experienced due to rules governing research. In the past they have been held on one specific day, but this year for the first time various events have been organised throughout the year. Next year, the BMBF may bring these two strands together under joint leadership of the "Hochschulrektorenkonferenz" (similar to our Association of University Vice-Chancellors). As before, however, the Ministry would avoid becoming involved at the working level. It is not clear yet how successful these initiatives have been. Some argue that any exposure of science to the public is welcome. Others say that it is mostly family and friends or outright opponents of particular areas of research who attend and that opinions are not changed, merely strengthened.

Biotechnology and the Bio-ethics Forum

22. Given the particular public concern about biotechnology, the government is setting up a Bioethics Forum to debate related ethical issues. Candidates are currently being selected by the Ministry. Each meeting of the Committee is to involve about a dozen participants from the research, political and academic communities. Journalists would also be present and able to put questions. Their subsequent reporting would inform the public of the issues involved. From this it is clear that the purpose of the Forum falls between the traditional ethics committee in the UK and BBSRC's recent consensus conference. The first meeting has been postponed several times, we are told for administrative reasons. Its topic for debate will be Human Genetics.

23. Gerhard Schröder, Minister-President of Lower Saxony and the SPD chief negotiator in the energy consensus talks, has drawn a parallel with nuclear energy and suggested talks on a political consensus on genetic technology given its implications for longer-term investment and Germany's industrial future. However, this is dismissed by the government officials on the grounds that genetic technology is not a party political issue and its implications for the economy are less far-reaching. The SPD, with its trades union roots long regarded as a pro-industry party, is now increasingly divided on the issue, and a large section is moving towards the Greens' viewpoint.

24. Influential voices in the CDU have also woken up to the longer term threat and a concerted attempt to promote biotechnology has resulted. All the same, some industrialists feel that Germany has all but missed the biotechnology boat. German companies are now in the habit of buying up research abroad or contracting out to overseas companies and subsidiaries (mostly in the US). Many question whether they will now risk changing this practice.

The Länder

25. While the main focus of this paper is on measures taken by the Federal Government, much of the day to day contact with ordinary Germans, and particularly school children, comes at a Land-level, as Education is a Land responsibility. There is not space to go into what each Land is doing. Most is of a fairly routine nature and built into the science curriculum. But there are cases where Land governments have taken high profile action to promote their science base and to stress the importance of research and technology in job creation. Bavaria has done much in this field. 4.1% of its budget is currently earmarked for research and technology, (for the country as a whole it is about 2.7%). But even there the Land government have experienced difficulty in getting their message across in the schools. Material promoting science has been suppressed or ignored by the teaching profession who contain a high proportion of anti-industry technosceptics.

Industry

26. We have already noted the role of the DIHT in promoting Science Days. The BDI (CBI equivalent) is active at a political level promoting industrial research and innovation. And specific industrial sector associations have taken action eg a press advertising campaign by the Chemical Industrial Association promoting the positive benefits of biotechnological advance and a series of factory visits for local authority and Land politicians and officials. But on the whole, industry has woken up late to the serious challenge to the future.

The Politicians

27. It was significant that after winning the general election last October, Chancellor Kohl moved swiftly to combine two relatively minor ministries into one large ministry responsible for science, technology, research and education. The extra clout that an enlarged ministry gave to the scientific community was further reinforced by the choice of Minister, Jürgen Rüttgers, a member of Kohl's inner circle of advisers and a rising star of the CDU. His appointment as "Minister for the Future" is seen as emphasising the high priority now given to technology in senior echelons of the administration. More than his predecessors, Rüttgers takes seriously the need to project policy to the public and has made some high key presentations on the need for new technologies if Germany is to survive as an advanced industrial economy. In particular, Rüttgers has demonstrated strong support for biotechnology, describing it as the key technology of the 21st Century. He has introduced policy initiatives aimed at making Germany the number one in biotechnology in Europe by the year 2000.

28. He has also focussed on innovation, stating that "innovation is the central task with which education and research must be concerned". The profile of the Ministry's innovation activities has been raised accordingly. With the same goal in mind, the BMBF has set up a Technology Council, chaired by the Chancellor, bringing together representatives from industry, the trade unions, research and government. Its purpose is to intensify cooperation between these sectors of society but it has no statutory power. Up to now, the council has met three times, concentrating on multimedia policy, and it has focussed public attention on the need for Germany to have the right attitudes towards and framework for the information society. A concluding report is due within weeks. The next subject for debate is likely to have an environmental slant.

OPINION POLLS

29. To gauge the response of public opinion to the effects of such measures, the BMBF has commissioned professional agencies to conduct opinion polls on various aspects of science over the last thirty years : a localised poll annually and an extensive one every four years.

30. One fascinating hypothesis to arise from the polls is a perceived link between wealth and attitudes to science. The first poll of attitudes to science in eastern Germany in 1990 revealed an attitude towards science and technology 6% more favourable than in the west. This difference disappeared in the five years following unification: mainly because the figures in the east fell. The hypothesis is that initially the poorer post-communist east saw technology as a way of acquiring the affluence they saw in the west. However the increasing equalisation of wealth throughout the federation achieved by common currency and subsidies may have changed perceptions.

31. The latest figures show 76% of all Germans being convinced of the benefit of technological advance with only 10% being sceptical. The differences between old and new Länder are insignificant. Men are shown as significantly more in favour than women: 82% for and 7% against compared with 71% and 13%. The under 30's show a markedly higher acceptance rate than the over 60's: 80% compared with 64%. As regards strength of feeling, the average preference level on a scale of 1 to 7 (1 being the most negative) was 5.2, namely that the acceptance of technology was in the main more than nominal.

32. The areas of research with most popular support were health, environment and energy. Biotechnology was the least supported area, largely due to the ongoing ethical concerns, followed by space research. Many see the latter as a costly academic pursuit with little bearing on everyday life.

33. Perhaps not surprisingly, the polls have led the government to conclude that public opinion in the main supports current levels and patterns of research funding. Commentaries on the results have added that scientists must increasingly be aware of the need to present their work to the public in order to maintain support.

CONCLUSION

Umwelt uber alles or Vorsprung durch Technik?

34. Environment above all else: or progress through technology? Thus may the central question on German attitudes to science be summarised. To what extent are Germans prepared to forego their privileged place at the forefront of technological advance, for a simpler back-to-nature lifestyle which does not put pressure on resources or the environment? The average, affluent German tends to be risk-averse, whether in industry (where risk capital is in its infancy) or in the public sector. Furthermore, while he may enjoy the material results, he is likely to have guilt feelings about securing them at cost to the environment. There are also large numbers of greens who seriously believe that technology has gone far enough and that further advances are not needed, even then most would support research in environment and health.

35. As in other countries, the public perception of risks associated with technological issues are often simplistic and highly susceptible to manipulation. In Germany, the Brent Spar saga showed this only to well. By playing on emotions, people can be led to worry about the small issues to the point of ignoring more important ones. However much rational thinkers may deride this the German Government cannot afford to ignore it.

36. Certainly, the Luddites are in the minority. BMBF officials believe their public campaign and those by individual Länder, industry and researchers themselves are slowly changing perceptions, particularly among young Germans. Hoechst say that planning permission for new plant now takes a few months instead of years - despite a Green Environment Minister in their home Land of Hesse. Further efforts are planned. The Institut der deutschen Wirtschaft recently identified a positive change in public perceptions of science: in a study, 80% of those questioned said they recognised the importance of technology to the country's economic well-being, while only 2% said they were indifferent. Leading politicians too have woken up to the importance of technology. In his annual address after winning the election in late 1994, Chancellor Kohl used the term innovation no less than twelve times. President Herzog recently noted that most of the 3 million jobs created in the last 10 years were thanks to technology and challenged the private sector to play its part more effectively. Research Minister Rüttgers has pledged that the federal research budget will grow by more than overall government expenditure after several years of relative decline.

37. It is also worth recalling that angst is something of a national pastime for the Germans. For all their worries about "Standort Deutschland", German industry remains strong and technologically orientated, and Germany's research infrastructure the most thorough and best financed in Europe. These strengths will not disappear overnight. Moreover, having identified a problem, the Germans are devoting resources to it with their traditional thoroughness and with expectations of long-term success.

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